

5.0 Summary of Analytical Results

The results of the chemical analysis of samples collected at the Impact Area South of Former POW Training Facility, Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, indicate that metals, VOCs, pesticides, and explosives were detected in the site media. SVOCs and explosive compounds were not detected in any of the samples collected. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, the analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by Shaw for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC. Metals concentrations exceeding the SSSLs and ESVs were subsequently compared to metals background screening values to determine if the metals concentrations are within natural background concentrations (SAIC, 1998).

Site metals data were also evaluated using statistical and geochemical methods to determine if the metals were site related (Appendix H). In addition, a preliminary human health risk assessment (PRA) and a preliminary ecological risk assessment (PERA) were performed to further characterize the potential threat to human health and ecological receptors, respectively.

The following sections and Tables 5-1 through 5-3 summarize the results of the comparison of detected constituent concentrations to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix F.

5.1 Surface Soil Analytical Results

Twenty-two surface soil samples were collected for chemical analysis at the IASPOW. Surface soil samples were collected from the uppermost foot of soil at the locations shown on Figure 3-1. Metals, VOCs, and one pesticide were detected in surface soils. Analytical results were compared to residential human health SSSLs, ESVs, and metals background screening values as presented in Table 5-1.

Metals. All of the surface soil samples were analyzed for metals. A total of 21 metals were detected in the samples. The concentrations of seven metals (aluminum, antimony, arsenic, chromium, iron, lead, and manganese) exceeded SSSLs. Of these, the following metals also exceeded their respective background concentrations in one or more samples:

Table 5-1

Surface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q,
Fort McClellan, Calhoun County, Alabama

(Page 1 of 9)

Sample Location Sample Number Sample Date Sample Depth (Feet)					IMP-IASPOW-GP01 QG0001 23-Jan-02 0- 1					IMP-IASPOW-GP02 QG0003 23-Jan-02 0- 1					IMP-IASPOW-GP03 QG0005 23-Jan-02 0- 1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	2.29E+04		YES	YES	YES	8.44E+03			YES	YES	2.65E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	8.80E+00			YES		4.99E+00			YES		1.34E+01			YES	YES
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	4.08E+01					3.02E+01					7.77E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	6.18E-01	J				4.55E-01	J				7.93E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	1.34E+02					1.01E+02	J				3.27E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.28E+01				YES	6.60E+00				YES	1.44E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	7.13E+00					4.00E+00					8.98E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.28E+01		YES			9.87E+00					3.76E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.61E+04			YES	YES	1.66E+04			YES	YES	2.92E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.60E+01					2.63E+01					1.10E+02		YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	6.65E+02					3.26E+02					1.07E+03		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	8.68E+02			YES	YES	4.19E+02			YES	YES	1.29E+03			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	6.79E-02	J				ND					4.03E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.14E+01		YES			6.42E+00					1.54E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	5.81E+02	J				4.33E+02	J				1.03E+03		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					ND					ND				
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	1.74E+00	J	YES			ND					1.88E+00	J	YES		
Sodium	mg/kg	6.34E+02	NA	NA	6.58E+01	J				5.93E+01	J				6.43E+01	J			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	3.66E+01				YES	1.60E+01				YES	3.86E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	3.79E+01					1.74E+01					4.00E+01				
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	NR					NR					NR				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	NR					NR					NR				
Tetrachloroethene	mg/kg	NA	1.21E+01	1.00E-02	NR					NR					NR				
Trichloroethene	mg/kg	NA	5.72E+01	1.00E-03	NR					NR					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					NR					NR				
PESTICIDES																			
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	NR					NR					NR				

Table 5-1

Surface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q,
Fort McClellan, Calhoun County, Alabama

(Page 2 of 9)

Sample Location Sample Number Sample Date Sample Depth (Feet)					IMP-IASPOW-GP04 QG0007 24-Jan-02 0- 1					IMP-IASPOW-GP05 QG0010 23-Jan-02 0- 1					IMP-IASPOW-GP06 QG0012 24-Jan-02 0- 1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	2.17E+04		YES	YES	YES	2.69E+04		YES	YES	YES	3.14E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	1.00E+01			YES	YES	9.19E+00			YES		1.21E+01	J		YES	YES
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.06E+02					5.11E+01					1.18E+02				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	8.71E-01	J	YES			6.41E-01	J				1.30E+00		YES		YES
Calcium	mg/kg	1.72E+03	NA	NA	3.94E+02					2.31E+02					2.19E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.47E+01				YES	1.99E+01				YES	3.77E+01		YES	YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	9.40E+00					2.34E+01		YES		YES	1.44E+01				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	5.55E+01		YES		YES	1.48E+01		YES			2.84E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.73E+04			YES	YES	3.31E+04			YES	YES	3.36E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	2.25E+02		YES		YES	6.52E+01		YES		YES	1.16E+02		YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	7.53E+02					7.88E+02					9.64E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.69E+03		YES	YES	YES	2.32E+03		YES	YES	YES	3.19E+03		YES	YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	3.33E-02	J				1.12E-01	J	YES		YES	3.86E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.39E+01		YES			1.17E+01		YES			1.68E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	7.05E+02					6.69E+02					8.87E+02		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					6.94E-01	J	YES			ND				
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	1.80E+00	J	YES			2.13E+00	J	YES		YES	ND				
Sodium	mg/kg	6.34E+02	NA	NA	6.82E+01	J				6.42E+01	J				4.74E+01	J			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	3.52E+01				YES	4.78E+01				YES	5.29E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	3.70E+01					3.10E+01					4.66E+01	J	YES		
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					NR					NR				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	1.80E-01	J				NR					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	3.00E-03	B				NR					NR				
Tetrachloroethene	mg/kg	NA	1.21E+01	1.00E-02	ND					NR					NR				
Trichloroethene	mg/kg	NA	5.72E+01	1.00E-03	ND					NR					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	ND					NR					NR				
PESTICIDES																			
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	ND					NR					NR				

Table 5-1

Surface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q,
Fort McClellan, Calhoun County, Alabama

(Page 3 of 9)

Sample Location Sample Number Sample Date Sample Depth (Feet)					IMP-IASPOW-GP07 QG0014 23-Jan-02 0-1					IMP-IASPOW-GP08 QG0015 23-Jan-02 0-1					IMP-IASPOW-GP09 QG0016 24-Jan-02 0-1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	2.45E+04		YES	YES	YES	3.20E+04		YES	YES	YES	3.06E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	1.66E+01	J	YES	YES	YES	1.04E+01	J		YES	YES	1.38E+01	J	YES	YES	YES
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	1.15E+02					8.99E+01					1.14E+02				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	1.28E+00		YES		YES	8.13E-01	J	YES			1.15E+00	J	YES		YES
Calcium	mg/kg	1.72E+03	NA	NA	2.34E+02					4.44E+02					1.39E+03				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.67E+01				YES	2.08E+01				YES	2.16E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	1.09E+01					9.85E+00					1.45E+01				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	5.36E+01		YES		YES	2.66E+01		YES			3.78E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	3.98E+04		YES	YES	YES	2.94E+04			YES	YES	3.27E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.64E+02		YES		YES	6.29E+01		YES		YES	1.93E+02		YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	8.96E+02					1.07E+03		YES			1.42E+03		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.83E+03		YES	YES	YES	7.70E+02			YES	YES	2.66E+03		YES	YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	4.58E-02	J				5.00E-02	J				4.18E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.73E+01		YES			1.53E+01		YES			1.82E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	1.02E+03		YES			9.03E+02		YES			1.04E+03		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					6.27E-01	J	YES			ND				
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	4.03E+01	J				4.34E+01	J				5.51E+01	J			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	4.43E+01				YES	4.63E+01				YES	4.84E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	5.54E+01	J	YES		YES	4.79E+01	J	YES			4.72E+01	J	YES		
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	NR					NR					NR				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	NR					NR					NR				
Tetrachloroethene	mg/kg	NA	1.21E+01	1.00E-02	NR					NR					NR				
Trichloroethene	mg/kg	NA	5.72E+01	1.00E-03	NR					NR					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					NR					NR				
PESTICIDES																			
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	NR					NR					NR				

Table 5-1

Surface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q,
Fort McClellan, Calhoun County, Alabama

(Page 4 of 9)

Sample Location Sample Number Sample Date Sample Depth (Feet)					IMP-IASPOW-GP10 QG0022 2-Oct-02 0-1					IMP-IASPOW-GP11 QG0024 2-Oct-02 0-1					IMP-IASPOW-GP12 QG0026 2-Oct-02 0-1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	1.22E+04			YES	YES	2.32E+04		YES	YES	YES	1.68E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	4.78E+00			YES		7.09E+00			YES		5.30E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	8.61E+01					8.44E+01					9.03E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	6.05E-01	J				7.39E-01	J				6.80E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	3.69E+02					4.70E+02					3.32E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	8.80E+00	J			YES	1.82E+01	J			YES	1.39E+01	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	5.60E+00					8.82E+00					7.62E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	7.49E+01		YES		YES	3.87E+01		YES			1.32E+02		YES		YES
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.44E+04			YES	YES	2.51E+04			YES	YES	1.79E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	4.22E+02		YES	YES	YES	1.88E+02		YES		YES	5.15E+02		YES	YES	YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	4.71E+02					8.65E+02					6.01E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.73E+03		YES	YES	YES	1.62E+03		YES	YES	YES	1.60E+03		YES	YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	3.81E-02	B				8.16E-02	B	YES			ND				
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	7.44E+00	J				1.20E+01	J	YES			8.29E+00	J			
Potassium	mg/kg	8.00E+02	NA	NA	6.29E+02					8.67E+02		YES			5.85E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.09E+00	B	YES		YES	1.25E+00	B	YES		YES	1.05E+00	B	YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	ND					2.50E+01	B				ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.98E+01	J			YES	3.69E+01	J			YES	2.72E+01	J			YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	2.71E+01					3.29E+01					4.31E+01		YES		
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	NR					NR					NR				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	NR					NR					NR				
Tetrachloroethene	mg/kg	NA	1.21E+01	1.00E-02	NR					NR					NR				
Trichloroethene	mg/kg	NA	5.72E+01	1.00E-03	NR					NR					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					NR					NR				
PESTICIDES																			
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	NR					NR					NR				

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Surface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q,
Fort McClellan, Calhoun County, Alabama

(Page 5 of 9)

Sample Location Sample Number Sample Date Sample Depth (Feet)					IMP-IASPOW-GP13 QG0028 2-Oct-02 0-1					IMP-IASPOW-GP14 QG0030 1-Oct-02 0-1					IMP-IASPOW-GP15 QG0033 1-Oct-02 0-1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	2.26E+04		YES	YES	YES	1.87E+04		YES	YES	YES	1.71E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					5.41E+00	J	YES	YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	6.12E+00			YES		9.35E+00			YES		8.68E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	7.80E+01					4.89E+01					8.89E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	7.03E-01	J				5.40E-01	J				7.57E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	4.62E+02					3.03E+02					5.32E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	2.06E+01	J			YES	2.40E+01			YES	YES	1.91E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	7.27E+00					1.15E+01					9.14E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	6.11E+01		YES		YES	1.36E+01		YES			2.00E+02		YES		YES
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.11E+04			YES	YES	3.05E+04			YES	YES	2.64E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	3.39E+02		YES		YES	5.29E+01		YES		YES	8.09E+02		YES	YES	YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	7.75E+02					5.38E+02					5.71E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.04E+03			YES	YES	1.42E+03	J		YES	YES	1.78E+03	J	YES	YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	6.75E-02	B				7.47E-02	J				6.06E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.16E+01	J	YES			8.07E+00					8.63E+00				
Potassium	mg/kg	8.00E+02	NA	NA	8.03E+02		YES			5.65E+02	J				5.41E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.54E+00	B	YES		YES	2.08E+00		YES		YES	1.33E+00	B	YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	3.07E+01	B				2.36E+01	B				2.61E+01	B			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	3.47E+01	J			YES	4.16E+01				YES	3.59E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	3.39E+01					2.18E+01	J				4.38E+01	J	YES		
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	NR					1.80E-02	J				NR				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					3.30E-01					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	NR					ND					NR				
Tetrachloroethene	mg/kg	NA	1.21E+01	1.00E-02	NR					ND					NR				
Trichloroethene	mg/kg	NA	5.72E+01	1.00E-03	NR					ND					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					2.90E-03	B				NR				
PESTICIDES																			
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	NR					8.90E-04	J				NR				

Table 5-1

Surface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q,
Fort McClellan, Calhoun County, Alabama

(Page 6 of 9)

Sample Location Sample Number Sample Date Sample Depth (Feet)					IMP-IASPOW-GP16 QG0035 1-Oct-02 0- 1					IMP-IASPOW-GP17 QG0037 2-Oct-02 0- 1					IMP-IASPOW-GP18 QG0039 2-Oct-02 0- 1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	2.21E+04		YES	YES	YES	2.61E+04		YES	YES	YES	2.48E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	8.24E+00			YES		7.72E+00			YES		7.62E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	4.19E+01					5.97E+01					9.38E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	4.69E-01	J				6.89E-01	J				8.85E-01	J	YES		
Calcium	mg/kg	1.72E+03	NA	NA	2.15E+02					2.02E+02					4.35E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	2.20E+01				YES	2.88E+01	J		YES	YES	2.05E+01	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	1.08E+01					9.36E+00					9.74E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.21E+01					3.20E+01		YES			1.57E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	3.03E+04			YES	YES	3.25E+04			YES	YES	2.53E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	4.28E+01		YES			9.79E+01		YES		YES	6.43E+01		YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	6.31E+02					7.83E+02					8.45E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	9.26E+02	J		YES	YES	1.54E+03			YES	YES	2.01E+03		YES	YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	9.47E-02	J	YES			7.76E-02	B				5.02E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	9.40E+00					1.12E+01	J	YES			1.22E+01	J	YES		
Potassium	mg/kg	8.00E+02	NA	NA	5.40E+02	J				5.94E+02					7.50E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.71E+00		YES		YES	1.85E+00	B	YES		YES	1.39E+00	B	YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	2.55E+01	B				2.49E+01	B				2.67E+01	B			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	4.39E+01				YES	4.78E+01	J			YES	4.01E+01	J			YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	2.49E+01	J				3.12E+01					2.77E+01				
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	NR					NR					NR				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	NR					NR					NR				
Tetrachloroethene	mg/kg	NA	1.21E+01	1.00E-02	NR					NR					NR				
Trichloroethene	mg/kg	NA	5.72E+01	1.00E-03	NR					NR					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					NR					NR				
PESTICIDES																			
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	NR					NR					NR				

Table 5-1

Surface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q,
Fort McClellan, Calhoun County, Alabama

(Page 7 of 9)

Sample Location Sample Number Sample Date Sample Depth (Feet)					IMP-IASPOW-GP19 QG0041 2-Oct-02 0-1					IMP-IASPOW-GP20 QG0043 2-Oct-02 0-1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS														
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	3.05E+04		YES	YES	YES	2.03E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	9.18E+00			YES		8.61E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	9.79E+01					1.24E+02		YES		
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	9.58E-01	J	YES			1.57E+00		YES		YES
Calcium	mg/kg	1.72E+03	NA	NA	3.47E+02					4.02E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.81E+01	J			YES	1.48E+01	J			YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	1.03E+01					1.15E+01				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	3.62E+01		YES			4.18E+01		YES		YES
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.98E+04			YES	YES	4.54E+04		YES	YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.51E+02		YES		YES	2.54E+02		YES		YES
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	9.64E+02					8.96E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.26E+03		YES	YES	YES	2.54E+03		YES	YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	7.43E-02	J				7.97E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.57E+01	J	YES			1.72E+01	J	YES		
Potassium	mg/kg	8.00E+02	NA	NA	8.74E+02		YES			1.11E+03		YES		
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	1.80E+00	B	YES		YES	1.94E+00	B	YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	3.49E+01	B				2.58E+01	B			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	4.44E+01	J			YES	4.01E+01	J			YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	3.60E+01					4.73E+01		YES		
VOLATILE ORGANIC COMPOUNDS														
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	NR					NR				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					NR				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	NR					NR				
Tetrachloroethene	mg/kg	NA	1.21E+01	1.00E-02	NR					NR				
Trichloroethene	mg/kg	NA	5.72E+01	1.00E-03	NR					NR				
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					NR				
PESTICIDES														
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	NR					NR				

Table 5-1

Surface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q,
Fort McClellan, Calhoun County, Alabama

(Page 8 of 9)

Sample Location Sample Number Sample Date Sample Depth (Feet)					IMP-IASPOW-MW01 QG0017 23-Jan-02 0- 1					IMP-IASPOW-MW02 QG0019 24-Jan-02 0- 1				
Parameter	Units	BKG ^a	SSSL ^b	ESV ^b	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS														
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	2.05E+04		YES	YES	YES	2.08E+04		YES	YES	YES
Antimony	mg/kg	1.99E+00	3.11E+00	3.50E+00	ND					ND				
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	5.51E+00	J		YES		8.00E+00	J		YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	4.29E+01					5.81E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	4.73E-01	J				6.89E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	7.27E+01	J				1.80E+02				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.46E+01				YES	1.25E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	4.54E+00					8.97E+00				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.25E+01					1.46E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	2.20E+04			YES	YES	2.67E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.46E+01					3.03E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	6.35E+02					6.79E+02				
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.99E+02				YES	9.92E+02			YES	YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	3.57E-02	J				4.86E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	8.65E+00					1.19E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	6.35E+02					5.64E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					ND				
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	3.94E+01	J				3.96E+01	J			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	3.40E+01				YES	3.68E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	2.91E+01	J				2.91E+01	J			
VOLATILE ORGANIC COMPOUNDS														
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	NR					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	NR					1.40E-01	J			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	NR					3.90E-03	B			
Tetrachloroethene	mg/kg	NA	1.21E+01	1.00E-02	NR					1.20E-03	J			
Trichloroethene	mg/kg	NA	5.72E+01	1.00E-03	NR					1.90E-03	J			YES
Trichlorofluoromethane	mg/kg	NA	2.33E+03	1.00E-01	NR					2.00E-03	J			
PESTICIDES														
4,4'-DDT	mg/kg	NA	1.79E+00	2.50E-03	NR					ND				

Table 5-1

Surface Soil Analytical Results Impact Area South of Former POW Training Facility Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q, Fort McClellan, Calhoun County, Alabama

(Page 9 of 9)

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

^a BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

^b Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit.

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

NR - Not requested.

Qual - Data validation qualifier.

Table 5-2

Subsurface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcel 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

(Page 1 of 6)

Sample Location Sample Number Sample Date Sample Depth (Feet)				IMP-IASPOW-GP01 QG0002 23-Jan-02 3 - 4				IMP-IASPOW-GP02 QG0004 23-Jan-02 3 - 4				IMP-IASPOW-GP03 QG0006 23-Jan-02 3 - 4				IMP-IASPOW-GP03 QG0045 29-Oct-02 4 - 6			
Parameter	Units	BKG ^a	SSSL ^b	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	1.52E+04		YES	YES	1.88E+04		YES	YES	1.96E+04		YES	YES	1.98E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				1.33E+03	J	YES	YES	ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	5.11E+00			YES	5.55E+00			YES	1.17E+02		YES	YES	7.91E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	2.63E+01				8.76E+01				6.84E+01				4.26E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	ND				5.61E-01	J			9.60E-01	J	YES		7.37E-01	J		
Calcium	mg/kg	6.37E+02	NA	4.77E+01	J			3.28E+02				2.02E+02				6.59E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	1.07E+01				1.09E+01				1.66E+01				2.54E+01			YES
Cobalt	mg/kg	1.75E+01	4.68E+02	3.09E+00				6.47E+00				8.99E+00				4.51E+00			
Copper	mg/kg	1.94E+01	3.13E+02	7.64E+00				8.14E+01		YES		3.84E+01		YES		1.00E+01			
Iron	mg/kg	4.48E+04	2.34E+03	1.50E+04			YES	1.52E+04			YES	3.31E+04			YES	3.23E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.06E+01				4.29E+02		YES	YES	2.22E+04		YES	YES	1.53E+01			
Magnesium	mg/kg	7.66E+02	NA	4.49E+02				6.81E+02				7.33E+02				6.06E+02			
Manganese	mg/kg	1.36E+03	3.63E+02	1.69E+02				1.56E+03		YES	YES	1.30E+03			YES	1.90E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	5.38E-02	J			3.77E-02	J			4.26E-02	J			4.81E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	7.27E+00				1.03E+01				1.31E+01		YES		1.04E+01			
Potassium	mg/kg	7.11E+02	NA	4.89E+02	J			6.59E+02				8.01E+02		YES		1.50E+03		YES	
Selenium	mg/kg	4.70E-01	3.91E+01	ND				ND				ND				2.09E+00	B	YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				3.01E+00		YES		ND			
Sodium	mg/kg	7.02E+02	NA	5.69E+01	J			6.47E+01	J			6.44E+01	J			2.15E+01	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	2.55E+01				2.65E+01				3.46E+01				3.43E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	1.73E+01				3.93E+01		YES		3.84E+01		YES		2.65E+01			
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	NR				NR				NR				NR			
Methylene chloride	mg/kg	NA	8.41E+01	NR				NR				NR				NR			
HERBICIDES																			
MCPP	mg/kg	NA	7.77E+00	NR				NR				NR				NR			

Table 5-2

Subsurface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcel 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

(Page 2 of 6)

Sample Location Sample Number Sample Date Sample Depth (Feet)				IMP-IASPOW-GP04 QG0008 24-Jan-02 3 - 4				IMP-IASPOW-GP05 QG0011 23-Jan-02 3 - 4				IMP-IASPOW-GP06 QG0013 24-Jan-02 3 - 4				IMP-IASPOW-GP10 QG0023 2-Oct-02 3 - 4			
Parameter	Units	BKG ^a	SSSL ^b	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	2.31E+04		YES	YES	3.01E+04		YES	YES	3.16E+04		YES	YES	2.23E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				ND				ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	6.56E+00			YES	1.10E+01	J		YES	1.20E+01	J		YES	5.99E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	3.56E+01				4.29E+01				5.33E+01				3.31E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	4.33E-01	J			6.88E-01	J			7.48E-01	J			4.13E-01	J		
Calcium	mg/kg	6.37E+02	NA	1.44E+02				1.20E+02	J			8.74E+01	J			1.01E+02	J		
Chromium	mg/kg	3.83E+01	2.32E+01	1.55E+01				1.97E+01				1.88E+01				2.27E+01	J		
Cobalt	mg/kg	1.75E+01	4.68E+02	4.93E+00				1.03E+01				1.80E+01		YES		4.49E+00			
Copper	mg/kg	1.94E+01	3.13E+02	1.18E+01				1.90E+01				1.86E+01				8.81E+00			
Iron	mg/kg	4.48E+04	2.34E+03	2.38E+04			YES	3.51E+04			YES	3.61E+04			YES	2.29E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.71E+01				2.99E+01				4.10E+01		YES		1.87E+01			
Magnesium	mg/kg	7.66E+02	NA	6.33E+02				8.63E+02		YES		8.79E+02		YES		6.22E+02			
Manganese	mg/kg	1.36E+03	3.63E+02	2.58E+02				6.33E+02			YES	1.18E+03			YES	3.46E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	7.36E-02	J	YES		1.09E-01	J	YES		8.11E-02	J	YES		1.48E-01		YES	
Nickel	mg/kg	1.29E+01	1.54E+02	1.17E+01				1.34E+01		YES		1.50E+01		YES		1.01E+01	J		
Potassium	mg/kg	7.11E+02	NA	6.03E+02	J			8.10E+02		YES		8.40E+02		YES		5.58E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	ND				8.98E-01	J	YES		8.36E-01	J	YES		1.46E+00	B	YES	
Silver	mg/kg	2.40E-01	3.91E+01	1.91E+00	J	YES		ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	6.80E+01	J			4.39E+01	J			4.73E+01	J			2.47E+01	B		
Vanadium	mg/kg	6.49E+01	5.31E+01	3.44E+01				5.39E+01			YES	5.97E+01			YES	3.34E+01	J		
Zinc	mg/kg	3.49E+01	2.34E+03	2.81E+01				4.11E+01	J	YES		4.38E+01	J	YES		2.23E+01			
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	1.10E-02	J			NR				NR				NR			
Methylene chloride	mg/kg	NA	8.41E+01	3.40E-03	B			NR				NR				NR			
HERBICIDES																			
MCPP	mg/kg	NA	7.77E+00	7.40E-01	J			NR				NR				NR			

Table 5-2

Subsurface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcel 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

(Page 3 of 6)

Sample Location Sample Number Sample Date Sample Depth (Feet)				IMP-IASPOW-GP11 QG0025 2-Oct-02 3 - 4				IMP-IASPOW-GP12 QG0027 2-Oct-02 3 - 4				IMP-IASPOW-GP13 QG0029 2-Oct-02 3 - 4				IMP-IASPOW-GP14 QG0031 1-Oct-02 2 - 4			
Parameter	Units	BKG ^a	SSSL ^b	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	1.96E+04		YES	YES	1.75E+04		YES	YES	1.56E+04		YES	YES	1.95E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				ND				5.39E+00	J	YES	YES
Arsenic	mg/kg	1.83E+01	4.26E-01	4.10E+00			YES	3.59E+00			YES	4.26E+00			YES	1.18E+01			YES
Barium	mg/kg	2.34E+02	5.47E+02	2.95E+01				3.45E+01				2.82E+01				2.49E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	ND				ND				ND				4.36E-01	J		
Calcium	mg/kg	6.37E+02	NA	1.04E+02	J			6.61E+01	J			8.05E+01	J			5.93E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	1.30E+01	J			1.75E+01	J			1.80E+01	J			2.15E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	3.65E+00				1.98E+00	B			2.28E+00	B			7.86E+00	J		
Copper	mg/kg	1.94E+01	3.13E+02	8.12E+00				1.19E+01				9.03E+00				1.08E+01			
Iron	mg/kg	4.48E+04	2.34E+03	1.84E+04			YES	2.00E+04			YES	2.10E+04			YES	4.10E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.64E+01				2.95E+01				9.43E+00				2.03E+01	J		
Magnesium	mg/kg	7.66E+02	NA	6.51E+02				5.79E+02				5.21E+02				4.13E+02			
Manganese	mg/kg	1.36E+03	3.63E+02	2.98E+02				1.21E+02				8.70E+01				3.06E+02	J		
Mercury	mg/kg	7.00E-02	2.33E+00	3.57E-02	B			ND				4.56E-02	B			9.70E-02	J	YES	
Nickel	mg/kg	1.29E+01	1.54E+02	8.20E+00	J			6.41E+00	J			6.74E+00	J			6.25E+00			
Potassium	mg/kg	7.11E+02	NA	4.60E+02	J			9.25E+02		YES		5.19E+02	J			4.65E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.59E+00	B	YES		1.09E+00	B	YES		1.07E+00	B	YES		2.05E+00		YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	2.40E+01	B			2.38E+01	B			ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	2.91E+01	J			3.06E+01	J			3.06E+01	J			5.39E+01			YES
Zinc	mg/kg	3.49E+01	2.34E+03	2.19E+01				1.87E+01				1.77E+01				1.98E+01	J		
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	NR				NR				NR				2.20E-02			
Methylene chloride	mg/kg	NA	8.41E+01	NR				NR				NR				ND			
HERBICIDES																			
MCPP	mg/kg	NA	7.77E+00	NR				NR				NR				ND			

Table 5-2

Subsurface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcel 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

(Page 4 of 6)

Sample Location Sample Number Sample Date Sample Depth (Feet)				IMP-IASPOW-GP15 QG0034 1-Oct-02 2 - 4				IMP-IASPOW-GP16 QG0036 1-Oct-02 3 - 4				IMP-IASPOW-GP17 QG0038 2-Oct-02 3 - 4				IMP-IASPOW-GP18 QG0040 2-Oct-02 3 - 4			
Parameter	Units	BKG ^a	SSSL ^b	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	2.12E+04		YES	YES	1.61E+04		YES	YES	1.78E+04		YES	YES	2.24E+04		YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				ND				ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	9.69E+00			YES	8.92E+00			YES	4.76E+00			YES	8.23E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	2.99E+01				1.96E+01				2.20E+01				2.73E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	5.11E-01	J			ND				3.40E-01	J			5.25E-01	J		
Calcium	mg/kg	6.37E+02	NA	1.15E+02	J			5.25E+01	J			4.97E+01	J			6.88E+01	J		
Chromium	mg/kg	3.83E+01	2.32E+01	3.62E+01			YES	2.29E+01				1.44E+01	J			7.18E+01	J	YES	YES
Cobalt	mg/kg	1.75E+01	4.68E+02	1.06E+01				3.03E+00				2.37E+00	B			4.30E+00			
Copper	mg/kg	1.94E+01	3.13E+02	1.34E+01				1.16E+01				9.78E+00				1.19E+01			
Iron	mg/kg	4.48E+04	2.34E+03	4.24E+04			YES	3.56E+04			YES	2.44E+04			YES	3.73E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	3.04E+01				1.40E+01				1.20E+01				1.93E+01			
Magnesium	mg/kg	7.66E+02	NA	4.65E+02				3.17E+02				4.87E+02				5.61E+02			
Manganese	mg/kg	1.36E+03	3.63E+02	5.83E+02	J		YES	9.81E+01	J			1.37E+02				3.51E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	1.57E-01			YES	9.09E-02	J	YES		4.54E-02	B			8.72E-02	J	YES	
Nickel	mg/kg	1.29E+01	1.54E+02	7.08E+00				4.47E+00				6.73E+00	J			8.76E+00	J		
Potassium	mg/kg	7.11E+02	NA	4.42E+02	J			4.36E+02	J			4.55E+02	J			5.26E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	2.07E+00			YES	1.61E+00			YES	1.44E+00	B	YES		1.66E+00	B	YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	2.54E+01	B			ND				ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	5.72E+01			YES	5.16E+01				3.70E+01	J			5.23E+01	J		
Zinc	mg/kg	3.49E+01	2.34E+03	2.26E+01	J			2.05E+01	J			2.09E+01				2.45E+01			
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	NR				NR				NR				NR			
Methylene chloride	mg/kg	NA	8.41E+01	NR				NR				NR				NR			
HERBICIDES																			
MCPP	mg/kg	NA	7.77E+00	NR				NR				NR				NR			

Table 5-2

Subsurface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcel 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

(Page 5 of 6)

Sample Location Sample Number Sample Date Sample Depth (Feet)				IMP-IASPOW-GP19 QG0042 2-Oct-02 3 - 4				IMP-IASPOW-GP20 QG0044 2-Oct-02 3 - 4				IMP-IASPOW-MW01 QG0018 23-Jan-02 3 - 4				IMP-IASPOW-MW02 QG0020 24-Jan-02 3 - 4			
Parameter	Units	BKG ^a	SSSL ^b	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	2.26E+04		YES	YES	3.05E+04		YES	YES	2.00E+04		YES	YES	1.48E+04	J	YES	YES
Antimony	mg/kg	1.31E+00	3.11E+00	ND				ND				ND				ND			
Arsenic	mg/kg	1.83E+01	4.26E-01	6.04E+00			YES	8.90E+00			YES	7.51E+00	J		YES	4.86E+00	J		YES
Barium	mg/kg	2.34E+02	5.47E+02	2.69E+01				4.25E+01				5.08E+01				3.22E+01	J		
Beryllium	mg/kg	8.60E-01	9.60E+00	4.37E-01	J			6.76E-01	J			5.77E-01	J			ND			
Calcium	mg/kg	6.37E+02	NA	6.77E+01	J			1.45E+02				4.99E+01	B			6.14E+01	B		
Chromium	mg/kg	3.83E+01	2.32E+01	1.81E+01	J			4.40E+01	J	YES	YES	2.26E+01				9.56E+00	J		
Cobalt	mg/kg	1.75E+01	4.68E+02	2.65E+00	B			9.41E+00				2.71E+00				6.81E+00			
Copper	mg/kg	1.94E+01	3.13E+02	1.07E+01				1.14E+01				1.43E+01				8.50E+00	J		
Iron	mg/kg	4.48E+04	2.34E+03	2.81E+04			YES	3.25E+04			YES	2.82E+04			YES	2.17E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.69E+01				3.05E+01				1.01E+01				2.43E+01			
Magnesium	mg/kg	7.66E+02	NA	5.83E+02				8.80E+02		YES		6.17E+02				3.28E+02	J		
Manganese	mg/kg	1.36E+03	3.63E+02	2.25E+02				1.61E+03		YES	YES	6.77E+01				7.87E+02			YES
Mercury	mg/kg	7.00E-02	2.33E+00	6.22E-02	J			8.05E-02	J	YES		ND				6.54E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	8.49E+00	J			1.41E+01	J	YES		7.40E+00				5.34E+00	J		
Potassium	mg/kg	7.11E+02	NA	5.40E+02	J			7.26E+02		YES		1.11E+03		YES		3.93E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.23E+00	B	YES		1.66E+00	J	YES		9.06E-01	J	YES		ND			
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	2.54E+01	B			3.62E+01	B			3.61E+01	J			3.46E+01	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	4.05E+01	J			5.53E+01	J		YES	4.15E+01				3.26E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	2.54E+01				3.08E+01				2.58E+01	J			1.60E+01	J		
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	7.76E+02	NR				NR				NR				1.10E-02	J		
Methylene chloride	mg/kg	NA	8.41E+01	NR				NR				NR				3.10E-03	B		
HERBICIDES																			
MCPP	mg/kg	NA	7.77E+00	NR				NR				NR				6.00E-01	J		

Table 5-2

**Subsurface Soil Analytical Results
Impact Area South of Former POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama**

(Page 6 of 6)

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

^a BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

^b Residential human health site-specific screening level (SSSL) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit.

J - Compound was positively identified; reported value is an estimated concentration.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

NR - Not requested.

Qual - Data validation qualifier.

Table 5-3

Groundwater Analytical Results
Impact Area South of POW Training Facility
Former Rifle/Machine Gun Ranges, Parcels 100Q and 101Q
Fort McClellan, Calhoun County, Alabama

Sample Location Sample Number Sample Date				IMP-IASPOW-MW01 QG3001 23-Apr-02				IMP-IASPOW-MW01 QG3004 2-Oct-02				IMP-IASPOW-MW02 QG3002 24-Apr-02				IMP-IASPOW-MW02 QG3005 24-Sep-02			
Parameter	Units	BKG ^a	SSSL ^b	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/L	2.34E+00	1.56E+00	3.16E-01				NR				1.74E-01	J			NR			
Arsenic	mg/L	1.78E-02	4.40E-05	2.38E-03	B		YES	NR				ND				NR			
Barium	mg/L	1.27E-01	1.10E-01	7.77E-03	B			NR				1.55E-02				NR			
Calcium	mg/L	5.65E+01	NA	4.99E+00	B			NR				3.52E+00	B			NR			
Cobalt	mg/L	2.34E-02	9.39E-02	ND				NR				1.53E-02	J			NR			
Iron	mg/L	7.04E+00	4.69E-01	6.73E-01	J		YES	NR				1.85E-01	J			NR			
Magnesium	mg/L	2.13E+01	NA	1.61E+00	B			NR				1.23E+00	B			NR			
Manganese	mg/L	5.81E-01	7.35E-02	9.67E-02	J		YES	NR				6.37E-01		YES	YES	NR			
Potassium	mg/L	7.20E+00	NA	1.01E+00	B			NR				1.09E+00	B			NR			
Sodium	mg/L	1.48E+01	NA	1.38E+00	B			NR				1.30E+00	B			NR			
PESTICIDES																			
4,4'-DDD	mg/L	NA	1.83E-04	NR				ND				1.60E-04	J			1.50E-04	J		
Aldrin	mg/L	NA	3.00E-06	NR				ND				8.00E-05	J		YES	ND			
Dieldrin	mg/L	NA	4.00E-06	NR				ND				1.60E-04	J		YES	ND			
Endosulfan I	mg/L	NA	9.35E-03	NR				ND				3.90E-05	J			2.50E-05	J		
Endosulfan II	mg/L	NA	9.35E-03	NR				ND				ND				2.50E-05	J		
Endrin	mg/L	NA	4.48E-04	NR				5.80E-05	J			2.20E-04				1.60E-04	J		
Heptachlor epoxide	mg/L	NA	6.00E-06	NR				2.10E-05	J		YES	3.40E-05	J		YES	3.20E-05	J		YES
alpha-Chlordane	mg/L	NA	1.74E-04	NR				3.90E-05	J			1.50E-04	J			4.70E-05	J		
beta-BHC	mg/L	NA	3.60E-05	NR				ND				6.90E-05	J		YES	ND			
delta-BHC	mg/L	NA	4.49E-04	NR				ND				3.00E-05	J			ND			
gamma-BHC (Lindane)	mg/L	NA	5.00E-05	NR				ND				3.80E-05	J			2.10E-05	J		
gamma-Chlordane	mg/L	NA	1.74E-04	NR				3.70E-05	J			ND				8.10E-05	J		
EXPLOSIVES																			
2-Nitrotoluene	mg/L	NA	1.53E-02	ND				ND				2.10E-03				ND			
4-Amino-2,6-dinitrotoluene	mg/L	NA	9.30E-05	4.50E-04			YES	ND				1.10E-03			YES	ND			

Analyses performed using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods.

^a BKG - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in SAIC, 1998, *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

^b Residential human health site-specific screening level (SSSL) as given in IT, 2000, *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit.

J - Compound was positively identified; reported value is an estimated concentration.

mg/L - Milligrams per liter.

NA - Not available.

ND - Not detected.

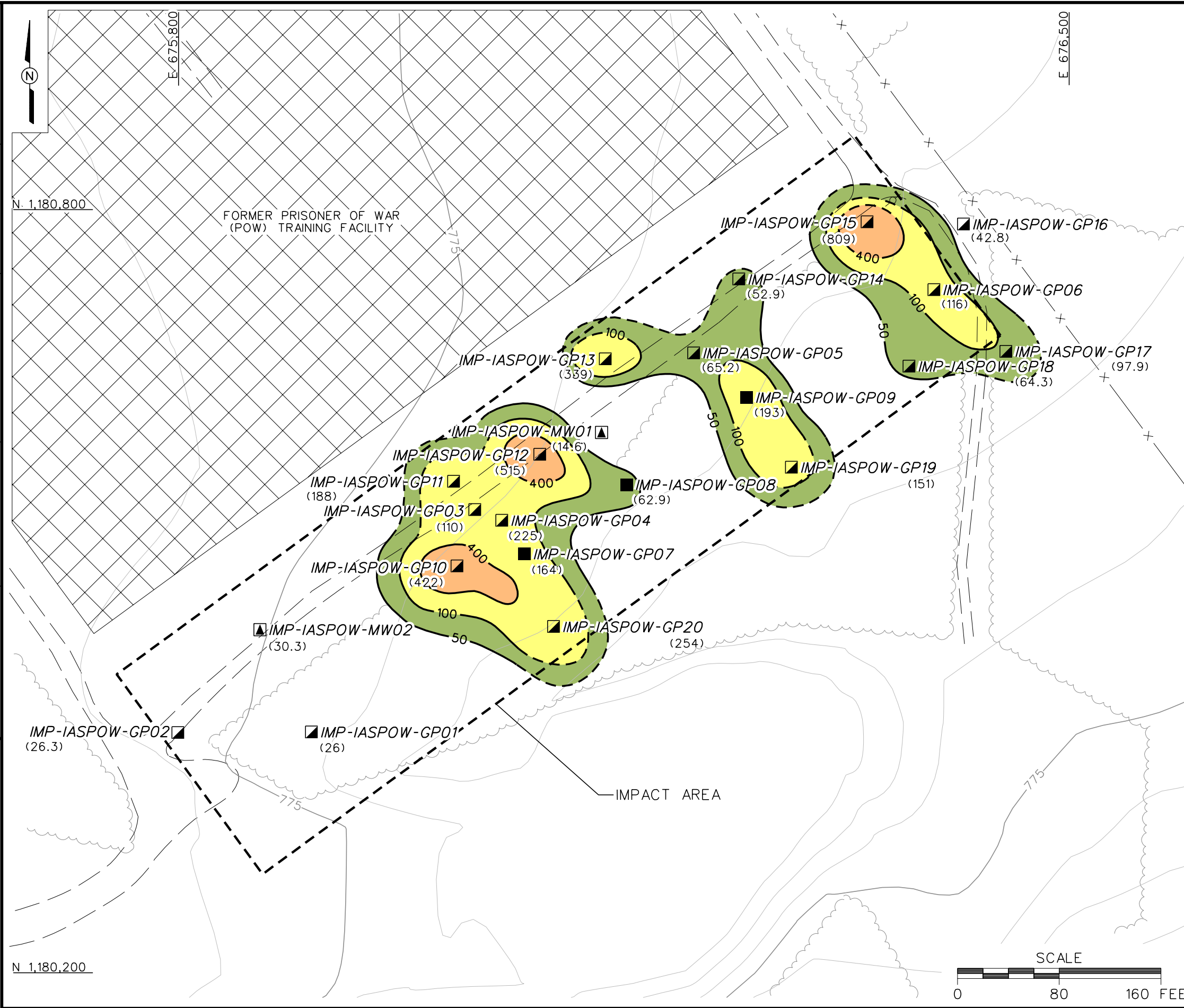
NR - Not requested.

Qual - Data validation qualifier.

- Aluminum (16,800 to 32,000 milligrams per kilogram [mg/kg]) exceeded its SSSL (7,803 mg/kg) and background (16,306 mg/kg) at 20 sample locations.
- Antimony (5.41 mg/kg) exceeded its SSSL (3.11 mg/kg) and background (1.99 mg/kg) at sample location IMP-IASPOW-GP15. The result was flagged with a "J" data qualifier, indicating that the concentration was estimated.
- Arsenic (16.6 and 13.8 mg/kg) exceeded its SSSL (0.43 mg/kg) and background (13.7 mg/kg) at two sample locations (IMP-IASPOW-GP07 and IMP-IASPOW-GP09).
- Chromium (37.7 mg/kg) exceeded its SSSL (23.2 mg/kg) and background (37.0 mg/kg) at sample location IMP-IASPOW-GP06.
- Iron (39,800 and 45,400 mg/kg) exceeded its SSSL (2,345 mg/kg) and background (34,154 mg/kg) at two sample locations (IMP-IASPOW-GP07 and IMP-IASPOW-GP20).
- Lead (422, 515, and 809 mg/kg) exceeded its SSSL (400 mg/kg) and background (40 mg/kg) at three sample locations (IMP-IASPOW-GP10, IMP-IASPOW-GP12, and IMP-IASPOW-GP15). Figure 5-1 shows the distribution of lead in surface soil.
- Manganese (1,600 to 3,190 mg/kg) exceeded its SSSL (363 mg/kg) and background (1,579 mg/kg) at 12 sample locations.

Fifteen metals were detected at concentrations exceeding ESVs: aluminum, antimony, arsenic, beryllium, chromium, cobalt, copper, iron, lead, manganese, mercury, selenium, silver, vanadium, and zinc. Of these, all but vanadium also exceeded their respective background concentrations in one or more samples:

- Aluminum (16,800 to 32,000 mg/kg) exceeded its ESV (50 mg/kg) and background (16,306 mg/kg) at 20 sample locations.
- Antimony (5.41 mg/kg) exceeded its ESV (3.5 mg/kg) and background (1.99 mg/kg) at sample location IMP-IASPOW-GP15. The result was flagged with a "J" data qualifier, indicating that the concentration was estimated.
- Arsenic (16.6 and 13.8 mg/kg) exceeded its ESV (10 mg/kg) and background (13.7 mg/kg) at two sample locations (IMP-IASPOW-GP07 and IMP-IASPOW-GP09).
- Beryllium (1.15 to 1.57 mg/kg) exceeded its ESV (1.1 mg/kg) and background (0.8 mg/kg) at four sample locations.



LEGEND

	UNIMPROVED ROADS AND PARKING
	TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
	TREES / TREELINE
	AREA OF INVESTIGATION
	FORMER PRISONER OF WAR (POW) TRAINING FACILITY
	FENCE
	SURFACE SOIL SAMPLE LOCATION
	SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
	MONITORING WELL / GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
	LEAD CONCENTRATION (mg/kg) (DASHED WHERE INFERRED)
(97.9)	CONCENTRATION IN MILLIGRAMS PER KILOGRAM (mg/kg)

NOTES:

1. BACKGROUND VALUE FOR LEAD IN SURFACE SOIL IS 40 mg/kg.
2. ECOLOGICAL SCREENING VALUE (ESV) FOR LEAD IN SURFACE SOIL IS 50 mg/kg.
3. SITE-SPECIFIC SCREENING LEVEL (SSSL) FOR LEAD IN SURFACE SOIL IS 400 mg/kg.

FIGURE 5-1
LEAD IN SURFACE SOIL
IMPACT AREA SOUTH OF POW
TRAINING FACILITY
FORMER RIFLE/MACHINE GUN RANGE
PARCELS 100Q AND 101Q

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

- Chromium (37.7 mg/kg) exceeded its ESV (0.4 mg/kg) and its background (37 mg/kg) at sample location IMP-IASPOW-GP06.
- Cobalt (23.4 mg/kg) exceeded its ESV (20 mg/kg) and background (15.2 mg/kg) at sample location IMP-IASPOW-GP05.
- Copper (41.8 to 200 mg/kg) exceeded its ESV (40 mg/kg) and background (12.7 mg/kg) at seven sample locations.
- Iron (39,800 and 45,400 mg/kg) exceeded its ESV (200 mg/kg) and its background (34,154 mg/kg) at two sample locations (IMP-IASPOW-GP07 and IMP-IASPOW-GP20).
- Lead (52.9 to 809 mg/kg) exceeded its ESV (50 mg/kg) and background (40 mg/kg) at 17 sample locations.
- Manganese (1,600 to 3,190 mg/kg) exceeded its ESV (100 mg/kg) and background (1,579 mg/kg) at 12 sample locations.
- Mercury (0.11 mg/kg) exceeded its ESV (0.1 mg/kg) and background (0.08 mg/kg) at sample location IMP-IASPOW-GP05. The result was "J" flagged.
- Selenium (1.05 to 2.08 mg/kg) exceeded its ESV (0.81 mg/kg) and background (0.48 mg/kg) at 11 locations. Nine of the results were flagged with a "B" data qualifier, signifying that selenium was also detected in an associated laboratory or field blank sample.
- Silver (2.13 mg/kg) exceeded its ESV (2.0 mg/kg) and background (0.36 mg/kg) at sample location IMP-IASPOW-GP05. The result was "J" flagged.
- Zinc (55.4 mg/kg) exceeded its ESV (50 mg/kg) and background (40.6 mg/kg) at sample location IMP-IASPOW-GP07. The result was "J" flagged.

Volatile Organic Compounds. Three surface soil sample locations (IMP-IASPOW-GP04, IMP-IASPOW-GP14, and IMP-IASPOW-MW02) were analyzed for VOCs. A total of six VOCs were detected in the samples at concentrations below SSSLs. The concentration of trichloroethene (0.0019 mg/kg) slightly exceeded its ESV (0.001 mg/kg) at sample location IMP-IASPOW-MW02. The result was "J" flagged, indicating that the concentration was estimated.

Semivolatile Organic Compounds. Three surface soil sample locations (IMP-IASPOW-GP04, IMP-IASPOW-GP14, and IMP-IASPOW-MW02) were analyzed for SVOCs. SVOCs were not detected in the samples.

Pesticides. Three surface soil sample locations (IMP-IASPOW-GP04, IMP-IASPOW-GP14, and IMP-IASPOW-MW02) were analyzed for pesticides. One pesticide (4,4'-dichlorodiphenyltrichloroethane [DDT]) was detected at one sample location (IMP-IASPOW-GP14) at a concentration below its SSSL and ESV.

Herbicides. Three surface soil sample locations (IMP-IASPOW-GP04, IMP-IASPOW-GP14, and IMP-IASPOW-MW02) were analyzed for herbicides. Herbicides were not detected in the samples.

Explosives. Twelve surface soil samples were analyzed for explosives. Explosives were not detected in the samples.

5.2 Subsurface Soil Analytical Results

Twenty subsurface soil samples were collected for chemical analysis at the IASPOW. Subsurface soil samples were collected at depths greater than one foot below ground surface at the locations shown on Figure 3-1. Metals, VOCs, and one herbicide were detected in subsurface soils. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-2.

Metals. All of the subsurface soil samples were analyzed for metals. A total of 21 metals were detected in the samples. The concentrations of eight metals (aluminum, antimony, arsenic, chromium, iron, lead, manganese, and vanadium) exceeded their respective SSSLs. Of these, six metals also exceeded their respective background concentrations:

- Aluminum (14,800 to 31,600 mg/kg) exceeded its SSSL (7,803 mg/kg) and background (13,591 mg/kg) at 20 sample locations.
- Antimony (1,330 and 5.39 mg/kg) exceeded its SSSL (3.11 mg/kg) and background (1.31 mg/kg) at two sample locations (IMP-IASPOW-GP03 and IMP-IASPOW-GP14). Both results were "J" flagged.
- Arsenic (117 mg/kg) exceeded its SSSL (0.4 mg/kg) and background (18.3 mg/kg) at sample location IMP-IASPOW-GP03.
- Chromium (71.8 and 44 mg/kg) exceeded its SSSL (23.2 mg/kg) and background (38.3 mg/kg) at two sample locations (IMP-IASPOW-GP18 and IMP-IASPOW-GP20). Both results were "J" flagged.

- Lead (429 and 22,000 mg/kg) exceeded its SSSL (400 mg/kg) and background (38.5 mg/kg) at two sample locations (IMP-IASPOW-GP02 and IMP-IASPOW-GP03).
- Manganese (1,560 and 1,610 mg/kg) exceeded its SSSL (363 mg/kg) and background (1,355 mg/kg) at two sample locations (IMP-IASPOW-GP02 and IMP-IASPOW-GP20).

Volatile Organic Compounds. Three subsurface soil sample locations (IMP-IASPOW-GP04, IMP-IASPOW-GP14, and IMP-IASPOW-MW02) were analyzed for VOCs. Two VOCs (acetone and methylene chloride) were detected in the samples at concentrations below their respective SSSLs. The methylene chloride results were flagged with a "B" data qualifier, signifying that methylene chloride was also detected in an associated laboratory or field blank sample.

Semivolatile Organic Compounds. Three subsurface soil sample locations (IMP-IASPOW-GP04, IMP-IASPOW-GP14, and IMP-IASPOW-MW02) were analyzed for SVOCs. SVOCs were not detected in the samples.

Pesticides. Three subsurface soil sample locations (IMP-IASPOW-GP04, IMP-IASPOW-GP14, and IMP-IASPOW-MW02) were analyzed for pesticides. Pesticides were not detected in the samples.

Herbicides. Three subsurface soil sample locations (IMP-IASPOW-GP04, IMP-IASPOW-GP14, and IMP-IASPOW-MW02) were analyzed for herbicides at IASPOW. One herbicide (MCPP) was detected at two locations (IMP-IASPOW-GP04 and IMP-IASPOW-MW02) at concentrations below its SSSL. Both results were flagged with a "J" data qualifier, indicating that the concentrations were estimated.

Explosives. Nine subsurface soil samples were analyzed for explosives at the IASPOW. Explosives were not detected in the samples.

5.3 Groundwater Analytical Results

Four groundwater samples were collected for chemical analysis at the IASPOW, at the two locations shown on Figure 3-1. Metals, explosives, and pesticides were detected in groundwater. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-3.

Metals. The two Phase I groundwater samples were analyzed for metals. A total of 10 metals were detected in the samples. The concentrations of three metals (arsenic, iron, and manganese) exceeded their respective SSSLs, but only manganese (0.64 milligrams per liter [mg/L]) exceeded both its SSSL (0.07 mg/L) and its background concentration (0.58 mg/L) at sample location IMP-IASPOW-MW02.

Volatile Organic Compounds. One groundwater sample location (IMP-IASPOW-MW02) was analyzed for VOCs during Phase I. VOCs were not detected in the sample.

Semivolatile Organic Compounds. One groundwater sample location (IMP-IASPOW-MW02) was analyzed for SVOCs during Phase I. SVOCs were not detected in the sample.

Pesticides. Three of the four groundwater samples (one Phase I sample and both Phase II samples) collected at the IASPOW were analyzed for pesticides. A total of 12 pesticides were detected in the samples. Four pesticides (aldrin, dieldrin, heptachlor epoxide, and beta-hexachlorocyclohexane [BHC]) were detected at concentrations exceeding their respective SSSLs:

- Aldrin (0.00008 mg/L) exceeded its SSSL (0.000003 mg/L) at IMP-IASPOW-MW02. The result was flagged with a "J" data qualifier, indicating that the concentration was estimated.
- Beta-BHC (0.000069 mg/L) exceeded its SSSL (0.000036 mg/L) at IMP-IASPOW-MW02. The result was "J" flagged.
- Dieldrin (0.00016 mg/L) exceeded its SSSL (0.000004 mg/L) at IMP-IASPOW-MW02. The result was "J" flagged.
- Heptachlor epoxide (0.000021 to 0.000034 mg/L) exceeded its SSSL (0.000006 mg/L) at IMP-IASPOW-MW01 and IMP-IASPOW-MW02. All of the results were "J" flagged.

Herbicides. One groundwater sample location (IMP-IASPOW-MW02) was analyzed for herbicides during Phase I. Herbicides were not detected in the sample.

Explosives. All of the groundwater samples were analyzed for explosives. A total of two explosives (4-amino-2,6-dinitrotoluene and 2-nitrotoluene) were detected in the Phase I samples. The concentrations of 4-amino-2,6-dinitrotoluene (0.00045 and 0.0011 mg/L) exceeded its SSSL

(0.000093 mg/L) in both IMP-IASPOW-MW01 and IMP-IASPOW-MW02, respectively. However, explosives were not detected in the Phase II samples.

5.4 Statistical and Geochemical Evaluation of Metals Data

Site metals data were further evaluated using statistical and geochemical methods to determine if the metals were site-related. This multi-tiered approach is described in the technical memorandum "Selecting Site-Related Chemicals for Human Health and Ecological Risk Assessments for FTMC: Revision 2" (Shaw, 2003). The statistical and geochemical evaluations determined that nearly all metals detected in the site media are present at naturally occurring levels (Appendix H). However, copper and lead have anomalously high concentrations in both the surface and subsurface soil intervals, and should be considered suspect.

5.5 Preliminary Risk Assessment

A preliminary risk assessment (PRA) was performed to further characterize the potential threat to human health from exposure to environmental media at the IASPOW. The PRA approach was developed at the request of EPA and ADEM to provide fast and inexpensive estimation of risk for relatively simple sites. It was derived from the streamlined risk assessment (SRA) protocol developed for FTMC and documented in the installation-wide work plan (IT, 1998). A PRA is a simplified version of an SRA, differing primarily in that the maximum detected concentration (MDC) rather than an estimate of average is adopted as the source-term concentration for use in the risk assessment. However, a PRA is more conservative than an SRA and is generally more protective. The PRA for the IASPOW is included as Appendix I. It discusses the environmental media of interest, selection of site-related chemicals, selection of COPCs, risk characterization, and conclusions.

The foundation of the PRA is the SSSL, which incorporates all the exposure and toxicological assumptions and precision of a complete baseline risk assessment. SSSLs are receptor-, medium-, and chemical-specific risk-based concentrations that are used to screen media to select COPCs and to characterize the risk, i.e., compute the incremental lifetime cancer risk (ILCR) and hazard index (HI) for noncancer effects associated with exposure to site media.

The SSSLs applied to a given site represent the most highly exposed receptor scenario for each of several plausible uses for the site. For the IASPOW, three receptor scenarios were evaluated: groundskeeper, construction worker, and resident. COPCs were selected from the site-related chemical with the appropriate SSSL. Chemicals that were identified as not being site-related were dropped from further consideration because their presence was not attributed to site

activities. The COPCs selected in this manner are the chemicals in each medium that may contribute significantly to cancer risk or to the potential for noncancer effects. As noted above, the MDC was selected as the source-term concentration for use in risk characterization. ILCR and HI values were estimated for each COPC in each medium and were summed to obtain total ILCR and HI values for each receptor.

Three metals (antimony, arsenic, and lead) were selected at COPCs in soil. Four organochlorine pesticides (aldrin, dieldrin, heptachlor epoxide, and beta-BHC) and the explosive compound 4-amino-2,6-dinitrotoluene were identified as COPCs in groundwater. The PRA concluded that the IASPOW can be released in its present condition for industrial use without further action, but not for residential or unrestricted use. The PRA noted two sources of uncertainty: (1) future health risks associated with metals in soil may increase as bullets and fragments degrade over time; and (2) the source of pesticides and explosive compounds detected in groundwater is unclear.

5.6 Preliminary Ecological Risk Assessment

A preliminary ecological risk assessment (PERA) was performed to further characterize the potential threat to ecological receptors from exposure to environmental media at the IASPOW. The PERA approach was derived from the screening-level ecological risk assessment protocol developed for FTMC and documented in the installation-wide work plan (IT, 1998). The PERA for IASPOW is included as Appendix J. It discusses the ecological habitat, environmental media of interest and data selection, selection of constituents of potential ecological concern (COPEC), risk characterization, and conclusions.

The medium of interest at the IASPOW is surface soil. Exposures to subsurface soil and groundwater are unlikely for ecological receptors at this site. In order to determine whether constituents detected in the site samples have the potential to pose adverse ecological risks, screening-level hazard quotients were developed via a three-step process as follows:

- 1) Comparison to ESVs
- 2) Identification of essential macronutrients
- 3) Comparison to naturally occurring background concentrations.

The ESVs represent the most conservative values available from various literature sources and have been selected to be protective of the most sensitive ecological assessment endpoints. The ESVs have been developed specifically for FTMC in conjunction with EPA Region 4 and are presented in the *Final Human Health and Ecological Screening Values and PAH Background*

1 *Summary Report* (IT, 2000b). The ESVs are based on no-observed-adverse-effect-levels
2 (NOAEL), when available. If a NOAEL-based ESV was not available for a certain constituent,
3 then the most health-productive value available from the scientific literature was used. If a
4 constituent was detected at a maximum concentration that exceeded its ESV, was not an essential
5 macronutrient, and was greater than the naturally occurring levels at FTMC, then it was selected
6 as a COPEC for further ecological risk characterization.

7
8 The PERA identified two metals (lead and copper) and one VOC (trichloroethene) as COPECs in
9 surface soil at the IASPOW. The PERA concluded that lead and copper have the potential to
10 pose ecological risk. The pattern of lead and copper concentrations were characterized to
11 identify distinct areas of contamination that are consistent with past site usage. Because of the
12 isolated nature of the detected trichloroethene in soil and its relatively low detected
13 concentration, the PERA concluded that the trichloroethene is not likely to pose an unacceptable
14 risk to ecological receptors.

6.0 Summary, Conclusions, and Recommendations

Shaw completed an SI at the IASPOW at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site at concentrations that pose an unacceptable risk to human health or the environment. The SI consisted of the collection and analysis of 22 surface soil samples, 20 subsurface soil samples, and 4 groundwater samples. In addition, two permanent monitoring wells were installed at the site to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information.

Chemical analysis of samples collected at the IASPOW indicates that metals, explosives, VOCs, pesticides, and herbicides were detected in site media. To evaluate whether the detected constituents pose an unacceptable risk to human health or the environment, the analytical results were compared to SSSLs, ESVs, and background screening values for FTMC. Site metals data were further evaluated using statistical and geochemical methods to determine if the metals were site related. A PRA and PERA were also performed to further characterize the potential threat to human health and the environment.

The PRA identified three metals (antimony, arsenic, and lead) as COPCs in soil. The metals are known to be constituents of bullets, and expended bullets and bullet fragments were observed on the surface over a substantial portion of the site. Groundwater COPCs were four organochlorine pesticides (aldrin, dieldrin, heptachlor epoxide, and beta-BHC), and the explosive compound 4-amino-2,6-dinitrotoluene. The PRA concluded that the IASPOW in its current state can be released for industrial use, but not for residential (or unrestricted) use.

The PERA identified two metals (lead and copper) and one VOC (trichloroethene) as chemicals of potential ecological concern in surface soil. Exposures to subsurface soil and groundwater were considered unlikely for ecological receptors at this site. The PERA concluded that the metals have the potential to pose ecological risk; however, the trichloroethene is unlikely to pose a ecological risk because of its isolated nature and relatively low detected concentration. The future industrial use of the site, however, will likely preclude the availability of suitable habitat for ecological receptors. Therefore, the potential threat to ecological receptors is expected to be low in the projected reuse scenario.

1 Based on the results of the SI, past operations at the IASPOW have impacted the environment.
2 The site is unsuitable for unrestricted reuse (i.e., residential). However, the site does not pose an
3 unacceptable risk to human health or the environment in the projected (industrial) land reuse
4 scenario. Therefore, Shaw Environmental, Inc. recommends restricting future site activities and
5 land reuse to industrial use only at the IASPOW.
6

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ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2-ADNT	2-amino-4,6-dinitrotoluene	AT	averaging time	CCV	continuing calibration verification
4-ADNT	4-amino-2,6-dinitrotoluene	atm-m ³ /mol	atmospheres per cubic meter per mole	CD	compact disc
2,4-D	2,4-dichlorophenoxyacetic acid	ATSDR	Agency for Toxic Substances and Disease Registry	CDTF	Chemical Defense Training Facility
2,4,5-T	2,4,5-trichlorophenoxyacetic acid	ATV	all-terrain vehicle	CEHNC	U.S. Army Engineering and Support Center, Huntsville
2,4,5-TP	2,4,5-trichlorophenoxypropionic acid	AUF	area use factor	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
3D	3D International Environmental Group	AWARE	Associated Water and Air Resources Engineers, Inc.	CERFA	Community Environmental Response Facilitation Act
AB	ambient blank	AWQC	ambient water quality criteria	CESAS	Corps of Engineers South Atlantic Savannah
AbB3	Anniston gravelly clay loam, 2 to 6 percent slopes, severely eroded	AWWSB	Anniston Water Works and Sewer Board	CF	conversion factor
AbC3	Anniston gravelly clay loam, 6 to 10 percent slopes, severely eroded	‘B’	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)	CFC	chlorofluorocarbon
AbD3	Anniston and Allen gravelly clay loams, 10 to 15 percent slopes, eroded	BAF	bioaccumulation factor	CFDP	Center for Domestic Preparedness
ABLM	adult blood lead model	BBGR	Baby Bains Gap Road	CFR	Code of Federal Regulations
Abs	skin absorption	BCF	blank correction factor; bioconcentration factor	CG	phosgene (carbonyl chloride)
ABS	dermal absorption factor	BCT	BRAC Cleanup Team	CGI	combustible gas indicator
AC	hydrogen cyanide	BERA	baseline ecological risk assessment	ch	inorganic clays of high plasticity
ACAD	AutoCadd	BEHP	bis(2-ethylhexyl)phthalate	CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded	BFB	bromofluorobenzene	CIH	Certified Industrial Hygienist
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded	BFE	base flood elevation	CK	cyanogen chloride
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded	BG	Bacillus globigii	cl	inorganic clays of low to medium plasticity
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded	BGR	Bains Gap Road	Cl	chlorinated
ACGIH	American Conference of Governmental Industrial Hygienists	bgs	below ground surface	CLP	Contract Laboratory Program
AdE	Anniston and Allen stony loam, 10 to 25 percent slope	BHC	hexachlorocyclohexane	cm	centimeter
ADEM	Alabama Department of Environmental Management	BHHRA	baseline human health risk assessment	CN	chloroacetophenone
ADPH	Alabama Department of Public Health	BIRTC	Branch Immaterial Replacement Training Center	CNB	chloroacetophenone, benzene, and carbon tetrachloride
AEC	U.S. Army Environmental Center	bkg	background	CNS	chloroacetophenone, chloropicrin, and chloroform
AEDA	ammunition, explosives, and other dangerous articles	bls	below land surface	CO	carbon monoxide
AEL	airborne exposure limit	BOD	biological oxygen demand	CO ₂	carbon dioxide
AET	adverse effect threshold	Bp	soil-to-plant biotransfer factors	Co-60	cobalt-60
AF	soil-to-skin adherence factor	BRAC	Base Realignment and Closure	CoA	Code of Alabama
AHA	ammunition holding area	Braun	Braun Intertec Corporation	COC	chain of custody; chemical of concern
AL	Alabama	BSAF	biota-to-sediment accumulation factors	COE	Corps of Engineers
ALARNG	Alabama Army National Guard	BSC	background screening criterion	Con	skin or eye contact
ALAD	δ-aminolevulinic acid dehydratase	BTAG	Biological Technical Assistance Group	COPC	chemical of potential concern
ALDOT	Alabama Department of Transportation	BTEX	benzene, toluene, ethyl benzene, and xylenes	COPEC	constituent of potential ecological concern
amb.	amber	BTOC	below top of casing	CPOM	coarse particulate organic matter
amsl	above mean sea level	BTV	background threshold value	CPSS	chemicals present in site samples
ANAD	Anniston Army Depot	BW	biological warfare; body weight	CQCSM	Contract Quality Control System Manager
AOC	area of concern	BZ	breathing zone; 3-quinuclidinyl benzilate	CRDL	contract-required detection limit
AP	armor piercing	C	ceiling limit value	CRL	certified reporting limit
APEC	areas of potential ecological concern	Ca	carcinogen	CRQL	contract-required quantitation limit
APT	armor-piercing tracer	CaCO ₃	calcium carbonate	CRZ	contamination reduction zone
AR	analysis request	CAA	Clean Air Act	Cs-137	cesium-137
ARAR	applicable or relevant and appropriate requirement	CAB	chemical warfare agent breakdown products	CS	ortho-chlorobenzylidene-malononitrile
AREE	area requiring environmental evaluation	CACM	Chemical Agent Contaminated Media	CSEM	conceptual site exposure model
AS/SVE	air sparging/soil vapor extraction	CAMU	corrective action management unit	CSM	conceptual site model
ASP	Ammunition Supply Point	CBR	chemical, biological, and radiological	CT	central tendency
ASR	Archives Search Report	CCAL	continuing calibration	ctr.	container
AST	aboveground storage tank	CCB	continuing calibration blank	CWA	chemical warfare agent; Clean Water Act
ASTM	American Society for Testing and Materials			CWM	chemical warfare material; clear, wide mouth

List of Abbreviations and Acronyms (Continued)

CX	dichloroformoxime
‘D’	duplicate; dilution
D&I	detection and identification
DAAMS	depot area agent monitoring station
DAF	dilution-attenuation factor
DANC	decontamination agent, non-corrosive
°C	degrees Celsius
°F	degrees Fahrenheit
DCA	dichloroethane
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEHP	di(2-ethylhexyl)phthalate
DEP	depositional soil
DFTPP	decafluorotriphenylphosphine
DI	deionized
DID	data item description
DIMP	di-isopropylmethylphosphonate
DM	dry matter; adamsite
DMBA	dimethylbenz(a)anthracene
DMMP	dimethylmethylphosphonate
DNAPL	dense nonaqueous-phase liquid
DNT	dinitrotoluene
DO	dissolved oxygen
DOD	U.S. Department of Defense
DOJ	U.S. Department of Justice
DOT	U.S. Department of Transportation
DP	direct-push
DPDO	Defense Property Disposal Office
DPT	direct-push technology
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
DSERTS	Defense Site Environmental Restoration Tracking System
DWEL	drinking water equivalent level
E&E	Ecology and Environment, Inc.
EB	equipment blank
EBS	environmental baseline survey
EC ₂₀	effects concentration for 20 percent of a test population
EC ₅₀	effects concentration for 50 percent of a test population
ECBC	Edgewood Chemical Biological Center
ED	exposure duration
EDD	electronic data deliverable
EF	exposure frequency
EDQL	ecological data quality level

EE/CA	engineering evaluation and cost analysis
Eh	oxidation-reduction potential
Elev.	elevation
EM	electromagnetic
EMI	Environmental Management Inc.
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive ordnance disposal
EODT	explosive ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
EPRI	Electrical Power Research Institute
EPT	Ephemeroptera, Plecoptera, Trichoptera
ER	equipment rinsate
ERA	ecological risk assessment
ER-L	effects range-low
ER-M	effects range-medium
ESE	Environmental Science and Engineering, Inc.
ESL	ecological screening level
ESMP	Endangered Species Management Plan
ESN	Environmental Services Network, Inc.
ESV	ecological screening value
ET	exposure time
EU	exposure unit
Exp.	Explosives
EXTOXNET	Extension Toxicology Network
E-W	east to west
EZ	exclusion zone
FAR	Federal Acquisition Regulations
FB	field blank
FBI	Family Biotic Index
FD	field duplicate
FDC	Former Decontamination Complex
FDA	U.S. Food and Drug Administration
Fe ⁺³	ferric iron
Fe ⁺²	ferrous iron
FedEx	Federal Express, Inc.
FEMA	Federal Emergency Management Agency
FFCA	Federal Facilities Compliance Act
FFE	field flame expedient
FFS	focused feasibility study
FI	fraction of exposure
Fil	filtered
Flt	filtered
FMDC	Fort McClellan Development Commission
FML	flexible membrane liner
f _{oc}	fraction organic carbon

FOMRA	Former Ordnance Motor Repair Area
FOST	Finding of Suitability to Transfer
Foster Wheeler	Foster Wheeler Environmental Corporation
FR	Federal Register
Frtn	fraction
FS	field split; feasibility study
FSP	field sampling plan
ft	feet
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
FTA	Fire Training Area
FTMC	Fort McClellan
FTRRA	FTMC Reuse & Redevelopment Authority
g	gram
g/m ³	gram per cubic meter
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
GAF	gastrointestinal absorption factor
gal	gallon
gal/min	gallons per minute
GB	sarin (isopropyl methylphosphonofluoridate)
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GCL	geosynthetic clay liner
GC/MS	gas chromatograph/mass spectrometer
GCR	geosynthetic clay liner
GFAA	graphite furnace atomic absorption
GIS	Geographic Information System
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GRA	general response action
GS	ground scar
GSA	General Services Administration; Geologic Survey of Alabama
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
H&S	health and safety
HA	hand auger
HC	mixture of hexachloroethane, aluminum powder, and zinc oxide (smoke producer)
HCl	hydrochloric acid
HD	distilled mustard (bis-[dichloroethyl]sulfide)

List of Abbreviations and Acronyms (Continued)

HDPE	high-density polyethylene	JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded	µg/g	micrograms per gram
HE	high explosive	JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded	µg/kg	micrograms per kilogram
HEAST	Health Effects Assessment Summary Tables	JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes	µg/L	micrograms per liter
Herb.	herbicides	JPA	Joint Powers Authority	µmhos/cm	micromhos per centimeter
HHRA	human health risk assessment	K	conductivity	MeV	mega electron volt
HI	hazard index	K _d	soil-water distribution coefficient	min	minimum
H ₂ O ₂	hydrogen peroxide	kg	kilogram	MINICAMS	miniature continuous air monitoring system
HPLC	high-performance liquid chromatography	KeV	kilo electron volt	ml	inorganic silts and very fine sands
HNO ₃	nitric acid	K _{oc}	organic carbon partitioning coefficient	mL	milliliter
HQ	hazard quotient	K _{ow}	octonal-water partition coefficient	mm	millimeter
HQ _{screen}	screening-level hazard quotient	KMnO ₄	potassium permanganate	MM	mounded material
hr	hour	L	liter; Lewisite (dichloro-[2-chloroethyl]sulfide)	MMBtu/hr	million Btu per hour
HRC	hydrogen releasing compound	L/kg/day	liters per kilogram per day	MNA	monitored natural attenuation
HSA	hollow-stem auger	l	liter	MnO ₄ -	permanganate ion
HSDB	Hazardous Substance Data Bank	LAW	light anti-tank weapon	MOA	Memorandum of Agreement
HTRW	hazardous, toxic, and radioactive waste	lb	pound	MOGAS	motor vehicle gasoline
‘I’	out of control, data rejected due to low recovery	LBP	lead-based paint	MOUT	Military Operations in Urban Terrain
IASPOW	Impact Area South of POW Training Facility	LC	liquid chromatography	MP	Military Police
IATA	International Air Transport Authority	LCS	laboratory control sample	MPA	methyl phosphonic acid
ICAL	initial calibration	LC ₅₀	lethal concentration for 50 percent population tested	MPC	maximum permissible concentration
ICB	initial calibration blank	LD ₅₀	lethal dose for 50 percent population tested	MPM	most probable munition
ICP	inductively-coupled plasma	LEL	lower explosive limit	MQL	method quantitation limit
ICRP	International Commission on Radiological Protection	LOAEL	lowest-observed-advserse-effects-level	MR	molasses residue
ICS	interference check sample	LOEC	lowest-observable-effect-concentration	MRL	method reporting limit
ID	inside diameter	LRA	land redevelopment authority	MS	matrix spike
IDL	instrument detection limit	LT	less than the certified reporting limit	mS/cm	millisiemens per centimeter
IDLH	immediately dangerous to life or health	LUC	land-use control	mS/m	millisiemens per meter
IDM	investigative-derived media	LUCAP	land-use control assurance plan	MSD	matrix spike duplicate
IDW	investigation-derived waste	LUCIP	land-use control implementation plan	MTBE	methyl tertiary butyl ether
IEUBK	Integrated Exposure Uptake Biokinetic	max	maximum	msl	mean sea level
IF	ingestion factor; inhalation factor	MB	method blank	MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
ILCR	incremental lifetime cancer risk	MCL	maximum contaminant level	mV	millivolts
IMPA	isopropylmethyl phosphonic acid	MCLG	maximum contaminant level goal	MW	monitoring well
IMR	Iron Mountain Road	MCPA	4-chloro-2-methylphenoxyacetic acid	MW1&MP	Monitoring Well Installation and Management Plan
in.	inch	MCPP	2-(2-methyl-4-chlorophenoxy)propionic acid	Na	sodium
Ing	ingestion	MCS	media cleanup standard	NA	not applicable; not available
Inh	inhalation	MD	matrix duplicate	NAD	North American Datum
IP	ionization potential	MDC	maximum detected concentration	NAD83	North American Datum of 1983
IPS	International Pipe Standard	MDCC	maximum detected constituent concentration	NaMnO ₄	sodium permanganate
IR	ingestion rate	MDL	method detection limit	NAVD88	North American Vertical Datum of 1988
IRDMIS	Installation Restoration Data Management Information System	mg	milligrams	NAS	National Academy of Sciences
IRIS	Integrated Risk Information Service	mg/kg	milligrams per kilogram	NCEA	National Center for Environmental Assessment
IRP	Installation Restoration Program	mg/kg/day	milligram per kilogram per day	NCP	National Contingency Plan
IS	internal standard	mg/kgbw/day	milligrams per kilogram of body weight per day	NCRP	National Council on Radiation Protection and Measurements
ISCP	Installation Spill Contingency Plan	mg/L	milligrams per liter	ND	not detected
IT	IT Corporation	mg/m ³	milligrams per cubic meter	NE	no evidence; northeast
ITEMS	IT Environmental Management System™	mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils	ne	not evaluated
‘J’	estimated concentration	MHz	megahertz	NEW	net explosive weight

List of Abbreviations and Acronyms (Continued)

NFA	No Further Action
NG	National Guard
NGP	National Guardsperson
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
Ni	nickel
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NLM	National Library of Medicine
NO ₃ ⁻	nitrate
NOEC	no-observable-effect-concentration
NPDES	National Pollutant Discharge Elimination System
NPW	net present worth
No.	number
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no-observed-adverse-effects-level
NR	not requested; not recorded; no risk
NRC	National Research Council
NRCC	National Research Council of Canada
NRHP	National Register of Historic Places
NRT	near real time
ns	nanosecond
N-S	north to south
NS	not surveyed
NSA	New South Associates, Inc.
nT	nanotesla
nT/m	nanoteslas per meter
NTU	nephelometric turbidity unit
nv	not validated
O ₂	oxygen
O ₃	ozone
O&G	oil and grease
O&M	operation and maintenance
OB/OD	open burning/open detonation
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
OH•	hydroxyl radical
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORC	Oxygen Releasing Compound
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OVM-PID/FID	organic vapor meter-photoionization detector/flame ionization detector
OWS	oil/water separator
oz	ounce

PA	preliminary assessment
PAH	polynuclear aromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PBMS	performance-based measurement system
PC	permeability coefficient
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-p-dioxins
PCDF	polychlorinated dibenzofurans
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEF	particulate emission factor
PEL	permissible exposure limit
PERA	preliminary ecological risk assessment
PERC	perchloroethene
PES	potential explosive site
Pest.	pesticides
PETN	pentaerythritoltetranitrate
PFT	portable flamethrower
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
PM	project manager
POC	point of contact
POL	petroleum, oils, and lubricants
POTW	publicly owned treatment works
POW	prisoner of war
PP	peristaltic pump; Proposed Plan
ppb	parts per billion
ppbv	parts per billion by volume
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PR	potential risk
PRA	preliminary risk assessment
PRG	preliminary remediation goal
PS	chloropicrin
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAM	quality assurance manual
QAO	quality assurance officer

QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental, Inc.
qty	quantity
Qual	qualifier
R	rejected data; resample; retardation factor
R&A	relevant and appropriate
RA	remedial action
RAO	remedial action objective
RBC	risk-based concentration; red blood cell
RBRG	risk-based remedial goal
RCRA	Resource Conservation and Recovery Act
RCWM	Recovered Chemical Warfare Material
RD	remedial design
RDX	cyclotrimethylenetrinitramine
ReB3	Rarden silty clay loams
REG	regular field sample
REL	recommended exposure limit
RFA	request for analysis
RfC	reference concentration
RfD	reference dose
RGO	remedial goal option
RI	remedial investigation
RL	reporting limit
RME	reasonable maximum exposure
ROD	Record of Decision
RPD	relative percent difference
RR	range residue
RRF	relative response factor
RRSE	Relative Risk Site Evaluation
RSD	relative standard deviation
RTC	Recruiting Training Center
RTECS	Registry of Toxic Effects of Chemical Substances
RTK	real-time kinematic
RWIMR	Ranges West of Iron Mountain Road
SA	exposed skin surface area
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
SARA	Superfund Amendments and Reauthorization Act
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SCM	site conceptual model
SD	sediment
SDG	sample delivery group
SDWA	Safe Drinking Water Act
SDZ	safe distance zone; surface danger zone

List of Abbreviations and Acronyms (Continued)

SEMS	Southern Environmental Management & Specialties, Inc.	SWMU	solid waste management unit	USATEU	U.S. Army Technical Escort Unit
SF	cancer slope factor	SWPP	storm water pollution prevention plan	USATHAMA	U.S. Army Toxic and Hazardous Material Agency
SFSP	site-specific field sampling plan	SZ	support zone	USC	United States Code
SGF	standard grade fuels	TAL	target analyte list	USCS	Unified Soil Classification System
Shaw	Shaw Environmental, Inc.	TAT	turn around time	USDA	U.S. Department of Agriculture
SHP	installation-wide safety and health plan	TB	trip blank	USEPA	U.S. Environmental Protection Agency
SI	site investigation	TBC	to be considered	USFWS	U.S. Fish and Wildlife Service
SINA	Special Interest Natural Area	TCA	trichloroethane	USGS	U.S. Geological Survey
SL	standing liquid	TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin	UST	underground storage tank
SLERA	screening-level ecological risk assessment	TCDF	tetrachlorodibenzofurans	UTL	upper tolerance level; upper tolerance limit
sm	silty sands; sand-silt mixtures	TCE	trichloroethene	UXO	unexploded ordnance
SM	Serratia marcescens	TCL	target compound list	UXOQCS	UXO Quality Control Supervisor
SMDP	Scientific Management Decision Point	TCLP	toxicity characteristic leaching procedure	UXOSO	UXO safety officer
s/n	signal-to-noise ratio	TDEC	Tennessee Department of Environment and Conservation	V	vanadium
SO ₄ ⁻²	sulfate	TDGCL	thiodiglycol	VC	vinyl chloride
SOD	soil oxidant demand	TDGCLA	thiodiglycol chloroacetic acid	VOA	volatile organic analyte
SOP	standard operating procedure	TEA	triethylaluminum	VOC	volatile organic compound
SOPQAM	U.S. EPA's <i>Standard Operating Procedure/Quality Assurance Manual</i>	Tetryl	trinitrophenylmethylnitramine	VOH	volatile organic hydrocarbon
sp	poorly graded sands; gravelly sands	TERC	Total Environmental Restoration Contract	VQlfr	validation qualifier
SP	submersible pump	THI	target hazard index	VQual	validation qualifier
SPCC	system performance calibration compound	TIC	tentatively identified compound	VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
SPCS	State Plane Coordinate System	TLV	threshold limit value	WAC	Women's Army Corps
SPM	sample planning module	TN	Tennessee	Weston	Roy F. Weston, Inc.
SQRT	screening quick reference tables	TNB	trinitrobenzene	WP	installation-wide work plan
Sr-90	strontium-90	TNT	trinitrotoluene	WRS	Wilcoxon rank sum
SRA	streamlined human health risk assessment	TOC	top of casing; total organic carbon	WS	watershed
SRI	supplemental remedial investigation	TPH	total petroleum hydrocarbons	WSA	Watershed Screening Assessment
SRM	standard reference material	TR	target cancer risk	WWI	World War I
Ss	stony rough land, sandstone series	TRADOC	U.S. Army Training and Doctrine Command	WWII	World War II
SS	surface soil	TRPH	total recoverable petroleum hydrocarbons	XRF	x-ray fluorescence
SSC	site-specific chemical	TRV	toxicity reference value	yd ³	cubic yards
SSHO	site safety and health officer	TSCA	Toxic Substances Control Act		
SSHP	site-specific safety and health plan	TSDF	treatment, storage, and disposal facility		
SSL	soil screening level	TSS	total suspended solids		
SSSL	site-specific screening level	TWA	time-weighted average		
SSSSL	site-specific soil screening level	UCL	upper confidence limit		
STB	supertropical bleach	UCR	upper certified range		
STC	source-term concentration	‘U’	not detected above reporting limit		
STD	standard deviation	UIC	underground injection control		
STEL	short-term exposure limit	UF	uncertainty factor		
STL	Severn-Trent Laboratories	URF	unit risk factor		
STOLS	Surface Towed Ordnance Locator System®	USACE	U.S. Army Corps of Engineers		
Std. units	standard units	USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine		
SU	standard unit	USAEC	U.S. Army Environmental Center		
SUXOS	senior UXO supervisor	USAEHA	U.S. Army Environmental Hygiene Agency		
SVOC	semivolatile organic compound	USACMLS	U.S. Army Chemical School		
SW	surface water	USAMPS	U.S. Army Military Police School		
SW-846	U.S. EPA's <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>	USATCES	U.S. Army Technical Center for Explosive Safety		